PATENT SPECIFICATION

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PROVISIONAL SPECIFICATION

Clutch-operating Mechanism

We, THE ROVER COMPANY LIMITED, a British Company, and POUL ARNE SCOTT-IVERSEN, a Danish Subject, both of New Meteor Works, Helen Street, Coventry, Warwickshire, do hereby declare the nature of this invention to be as follows:—

This invention relates to clutch-operating mechanism of the kind including thrust means which is slidably supported upon a shaft, to be actuated by a striking fork or the like, and which engages clutch-operating levers.

Our main object is to provide an improved form of thrust means whereby very sweet clutch operation will be obtained even when parts of the operating mechanism have become worn, and in particular to ensure that the disengagement pressure, and consequently the engagement pressure, is equally distributed between the clutch-operating levers.

According to the main feature of the invention the thrust means comprises inner and outer rings having part-spherical or equivalent rocking engagement with one another, and one engages the striking fork and the other the clutch-operating levers. They are preferably biassed axially relatively to one another.

In one simple construction according to the invention, as applied to a thrust means for a disc clutch, for a motor-vehicle, having a presser-plate which can be withdrawn through three symmetrically-arranged angularly-spaced levers, the inner of the concentric rings, which is slidably mounted upon the driven clutch shaft, may be a built-up one comprising a sleeve providing the inner races of a pair of ball bearings the outer races of which are endwise located by means of circlips round the sleeve ends, the sets of balls being located from one another by appropriate spacers. It may, however, take other forms. The outer ring has a part of its internal periphery formed to be part-spherical about a centre on the axis of the driven shaft and preferably in the interior of the thrust means. This part-spherical surface engages a corresponding part-spherical surface formed on the external periphery of the inner ring.

Alternatively, the appropriate surface of the outer ring may be frustum-shaped to make line contact with the co-acting surface on the inner ring.

Alternatively, the appropriate surface of the inner ring may be ridge-shaped or convex to a smaller radius than that of the concavity of the co-acting surface of the outer ring to provide line engagement therewith.

One radial face of the inner ring is engaged by the clutch-striking fork and the opposite radial face of the outer ring engages directly or indirectly the adjacent inner ends of the clutch-operating levers. Conveniently the two rings are biassed axially relatively to one another in engaging direction as by means of a compression spring disposed in the interior of a cylindrical flange of the outer ring to act between a circlip secured therein and an appropriate shoulder formed on the inner ring—for example, one of the radial faces of one of the outer races constituting a part of the inner ring when this is built up as above described.

When the withdrawal pressure is applied the outer ring can rock relatively to the inner ring as necessary to distribute the pressure evenly between the clutch-operating levers, and thereafter it tends to bind in this position until the withdrawal pressure is again released, thus ensuring a sweet take up of the clutch. It is unnecessary for the clutch-operating levers to be accurately formed and positioned, and thus manufacturing costs are kept low.

Dated this 14th day of November, 1936.

WALFORD & HARDMAN BROWN,
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Warwick Road, Coventry, Warwickshire.

COMPLETE SPECIFICATION

Clutch-operating Mechanism

We, THE ROVER COMPANY LIMITED, a British Company, and POUL ARNE SCOTT-IVERSEN, a Danish Subject, both of New Meteor Works, Helen Street, Coventry,

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Warwickshire, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to operating mechanism for a spring-engaged friction clutch, of the kind having a presser-plate which can be withdrawn by means of angularly-spaced operating levers, the operating mechanism including thrust means which can be actuated by a striking fork and which engages the operating levers.

Our main object is to provide an improved form of thrust means whereby very sweet clutch operation will be obtained even when parts of the clutch or of the operating mechanism have become worn, and in particular to ensure that the disengagement pressure, and consequently the engagement pressure, is equally distributed between the clutch-operating levers.

According to the invention the thrust means, which comprises inner and outer rings (either of which may be built up), of which the inner engages the striking fork and the other the operating levers, has one of the rings formed with a part-spherical surface and the other with a surface making line contact therewith such that when the withdrawal pressure is applied to the thrust means the outer ring can position itself relatively to the inner to equalize the load, and will then jam in this position, under the increasing load, and will remain jammed until the withdrawal pressure has been removed from the thrust means. In this way we ensure that the load will be equalized during engagement of the clutch, i.e., while the withdrawal pressure is being released.

Preferably it is the inner ring which has the part-spherical surface, the centre of this surface lying on the axis of a shaft along which the thrust means is slidable axially, and the outer ring has a coacting frustum-shaped surface.

In the accompanying drawing:—

Figure 1 is a sectional elevation of one form of thrust means, for the disc clutch of a motor-vehicle, arranged according to the invention; and

Figure 2 is a similar view of a modification.

The same reference characters denote similar parts throughout the drawing.

In the construction illustrated in Figure 1, as applied to a thrust means for a disc clutch having a spring-engaged presser-plate which can be withdrawn through three symmetrically-arranged angularly-spaced operating levers 11, the inner of the rings, which is slidably mounted upon the driven clutch shaft 12, is a built-up one comprising a sleeve 13 providing the inner races of a pair of ball bearings 14, 15 the outer races of which are formed in L-sectioned ring parts 16, 17 endwise located by means of circlips 18 round the sleeve ends. The sets of balls are located from one another by the flange 19. The outer ring 20 may have a part 20*a* of its internal periphery formed to be part-spherical about a centre on the axis of the driven shaft and preferably in the interior of the thrust means. This part-spherical surface engages a part-spherical surface, which is convex to a smaller radius than the concavity of the surface of the part 20*a*, formed on the external periphery of the ring part 16, whereby there is line contact between the two surfaces.

Alternatively, the appropriate surface of the outer ring 20, as is actually illustrated, may be frustum-shaped to make line contact with a part-spherical surface on the ring part 16, the centre of this part-spherical surface being on the axis of the driven shaft.

Alternatively, the appropriate surface of the ring part 16 may be ridge-shaped to provide line engagement with the part-spherical surface of the outer ring 20.

One radial face of the inner ring part 17 is engaged by the clutch-striking fork 21 and the opposite radial face of the outer ring engages the adjacent inner ends of the clutch-operating levers.

Conveniently the two rings are biassed axially relatively to one another in engaging direction as by means of a compression spring 22 disposed in the interior of a cylindrical flange of the outer ring 20 to act between a circlip 23 secured therein and an appropriate shoulder formed on the inner ring—for example, one of the radial faces of the ring part 16.

When the withdrawal pressure is applied the outer ring can rock relatively to the inner ring as necessary to distribute the pressure evenly between the clutch-operating levers, and thereafter it tends to bind in this position until the withdrawal pressure is again released, thus preventing distortion of the presser-plate and ensuring a sweet take up of the clutch. It is unnecessary for the clutch-operating levers to be accurately formed and positioned, and thus manufacturing costs are kept low.

It will be evident that to avoid wear of the ball bearings the arrangement should be such that the balls can roll about a suitable centre. Thus the drawing shows the flange 19 having its faces inclined so that the line 24 through the

points of contact of the balls 15 with the ring part 17 will intersect the shaft axis 25 at the point of intersection thereof of the line 26 drawn through the points of contact of the balls 15 with the sleeve 13. The other balls 14 are arranged in a similar manner.

In the modification of Figure 2, which is an inexpensive construction, the inner ring comprises an oil-less bush 13*a* slidable on the driven clutch shaft, and fitted in a metal sleeve 13*b* which is in turn fitted in the ring part 17. The latter is spaced from the ring part 16 by a single row of balls 27. The ring parts 16, 17 are held in this position by the ends of the metal sleeve 13*b* being out-turned, as shown at 28.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. For operating a spring-engaged friction clutch the presser-plate of which can be withdrawn by angularly-spaced operating levers, a thrust means which comprises an inner ring engaging the clutch striking fork, and an outer ring engaging the operating levers, one of the rings having a part-spherical surface and the other a surface making line contact therewith such that when the withdrawal pressure is applied to the thrust means the outer ring can position itself relatively to the inner to equalize the load, and will then jam in this position, under the increasing load, and will remain jammed until the withdrawal pressure has been removed from the thrust means.

2. A thrust means, according to Claim 1, including means, acting to bias the inner and outer rings axially relatively to one another, disposed in the interior of the outer ring.

3. A thrust means, according to Claim 1 or 2, where the inner ring is a built-up one including two ring parts endwise located with respect to one another and with at least one ring of balls operating between them.

4. A thrust means, according to Claim 3, characterised in that the ring parts are located on a metal sleeve by the ends of the latter being out-turned.

5. For operating a spring-engaged friction clutch, having a presser-plate which can be withdrawn by angularly-spaced operating levers, a thrust means including a sleeve adapted to be axially movable along the driven shaft of the clutch and having a radial flange between its ends, rings of balls engaged therewith and with the radial faces of the flange, L-sectioned ring parts respectively engaging the rings of balls and endwise located on the sleeve, one of the ring parts having a surface which is part-spherical about a centre on the axis of the sleeve and the other ring part being adapted to be engaged by the clutch striking fork, and an outer ring adapted to engage the clutch-operating levers and having an internal frustum-shaped surface resiliently pressed into engagement with the part-spherical surface.

6. A thrust means, according to Claim 5, having the parts arranged so that the line through the points of contact of one of the rings of balls with the sleeve and the line through the points of contact of this ring of balls with the associated L-sectioned ring part meet on the axis of the sleeve.

7. The complete thrust means, for operating a spring-engaged friction clutch having a presser-plate which can be withdrawn by angularly-spaced operating levers, substantially as described with reference to Figure 1 or to Figure 2 of the accompanying drawing.

Dated this 9th day of June, 1937.

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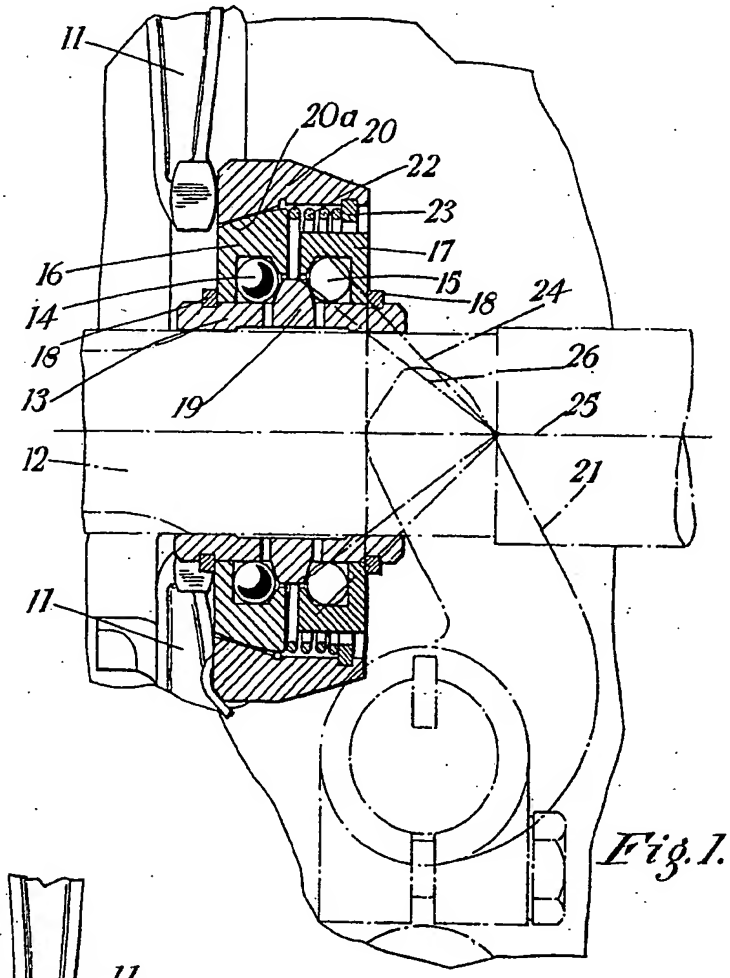

Fig. 1.

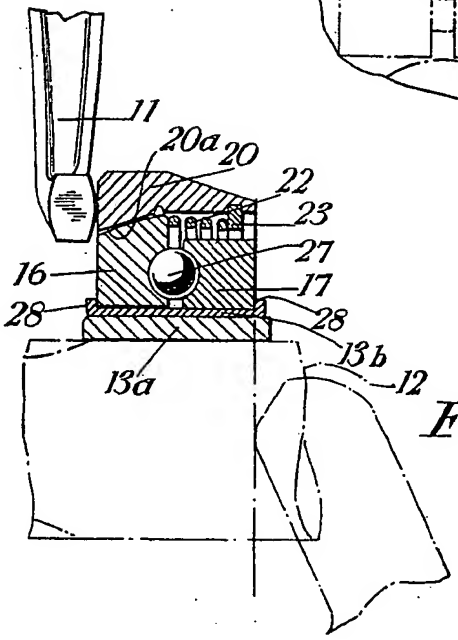

Fig. 2.

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